

CLAIMS

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S1 A2 5
1. A rotary electrical machine, especially an alternator or an alternator-starter for a motor vehicle, comprising a stator (S), a rotor (R), an airgap (E) between the stator (S) and the rotor (R), and permanent magnets incorporated in the rotor and/or in the stator, wherein the magnets constitute at least two groups each of which is defined by a specific type of composition, namely a first group of magnets containing rare earths and a second group consisting of ferrite magnets, characterised in that a plurality of sub-assemblies (720, 721-731, 730, 732-800, 810 ...) is provided, each sub-assembly combining at least one magnet of the first group with a magnet of the second group, at least one of the magnets being disposed radially so as to generate an orthoradial magnetic flux.
 - 10 2. An electrical machine according to Claim 1, characterised in that a plurality of sub-assemblies of magnets (720-721, 730-732, 800-810) are provided inside the rotor, each sub-assembly combining at least one magnet of the first group with at least one magnet of the second group, at least one of the said magnets being oriented radially so as to generate an orthoradial magnetic flux.
 - 15 3. An electrical machine according to Claim 2, characterised in that each sub-assembly comprises a magnet containing rare earths (721, 810) situated close to the airgap (E), arranged in superimposed relationship in a generally radial direction with a ferrite magnet (720, 800).
 - 20 4. An electrical machine according to Claim 2, characterised in that each sub-assembly comprises a magnet containing rare earths (730) in superimposed relationship in a radial direction with two ferrite magnets (731, 732) by which it is encircled.
 - 25 5. An electrical machine according to Claim 3 or Claim 4, characterised in that each sub-assembly comprises a magnet containing rare earths (910) situated close to the airgap (E) and in superimposed relationship in a generally radial direction with a ferrite magnet (900a, 900b) of the same thickness as the rare earth magnet, the said ferrite magnet including indexing means, in particular a chamfered portion (9000a) or a notch (9000b).
 - 30 35 6. An electrical machine according to any one of Claims 1 to 5, characterised in that the first group consisting of rare earth magnets is of smaller size than the second group consisting of ferrite magnets.

7. An electrical machine according to any one of Claims 1 to 6, characterised in that the sub-assemblies are mounted in the rotor (R).
8. An electrical machine according to Claim 7, characterised in that each sub-assembly consists of a magnet of the first group (721, 810 ...) situated close to the surface of the rotor (R) and arranged in superimposed relationship in a generally radial direction with a ferrite magnet (720, 800) situated close to the axis of rotation of the rotor.